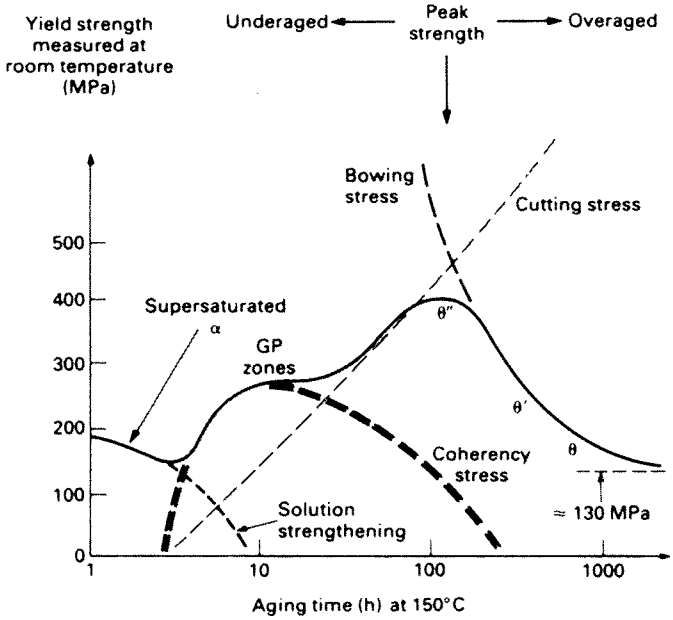
MEC-E6001 Engineering metals and alloys
Exam 27.5.2019

1. Explain effect of cooling rate on austenite decomposition, resulting microstructure, and mechanical properties.

2. What means sensitization of stainless steels? What effect does it have on properties? How it can be avoided?

3. What type of aluminium alloys can be precipitation hardened? Explain microstructural changes with development of yield strength during aging. How would the aging curve be different if the aging temperature had been 200°C instead of 150°C?



4. Requirement for martensite content after quenching for a 50 mm diameter shaft made of 0.4C-1Cr-0.2Mo (wt.%) steel is 90% at ¼ radius from surface and at least 50% at center. Can these be achieved? If not, what would be your suggestion? Comment your selection for quenching medium.